CLAIMS

1. (Original) A method of assessing the hepatotoxicity of a stimulus, the method comprising:

(a) analyzing an image of hepatocytes that have been exposed to a stimulus, wherein the analysis extracts features characterizing the hepatocytes; and

(b) classifying the stimulus by quantitatively evaluating the extracted features to identify one or more hepatotoxic pathologies resulting from the stimulus, wherein hepatotoxic pathology classifications include two or more of the following: necrosis, cholestasis, steatosis, fibrosis, apoptosis, and cirrhosis.

2. (Original) The method of claim 1, further comprising, prior to analyzing the image:

exposing a hepatocyte culture to the stimulus; and

imaging the hepatocytes to produce the image.

3. (Currently amended) The method of claim 2, wherein multiple hepatocyte cultures are located on a single support structure, and wherein each *in vitro* culture is exposed to a distinct stimulus.

4. (Original) The method of claim 3, wherein at least two of the cultures are exposed to different quantities of the same stimulus.

5. (Original) The method of claim 3, wherein the support structure is a glass or plastic support.

6. (Original) The method of claim 3, wherein hepatocytes are co-cultured with support cells.

7. (Original) The method of claim 1, wherein the stimulus is exposure to a chemical compound.

8. (Original) The method of claim 1, wherein the hepatocytes are transformed or immortalized cells.

9. (Original) The method of claim 8, wherein the transformed or immortalized cells have been modified to express one or more cytochrome P450 metabolizing enzymes.

10. (Original) The method of claim 1, wherein analyzing the image comprises segmenting the image to identify individual hepatocytes on the image.

11. (Original) The method of claim 1, wherein the features extracted in (a) comprise two or more of membrane permeability, enzyme activity, Golgi distribution, migration of cytochrome c from the mitrochondria, mitochondrial membrane potential, condensation, fragmentation and granularization of nuclei, accumulation of lipid containing vacuoles, bile production, actin morphology, and tight junction condition.

12-19. Cancelled